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## MATERIALS OF CONSUMER SCIENCE

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### THE DEVELOPMENT OF CRITERIA FOR CONSUMER EDUCATION

THE purpose of this particular investigation was to select and organize, from periodical literature, materials of consumer education which were suitable for integration into seventh, eighth and/or ninth-grade courses of general science.

If materials of consumer education were to be integrated effectively with the subject-matter now constituting the courses offered in our public schools, it became necessary, as the first step, to secure a definition, a set of criteria, or some other designation, which indicated unquestionably what is consumer education. A search was therefore made through approximately 175 masters' theses, doctors' dissertations, articles in periodicals, and books, for all the definitions and criteria of consumer education which they contained.

This search brought to light in a study by Klautsch,<sup>1</sup> an outline which seemed likely, with necessary modifications and additions, to serve as a set of criteria for consumer education which would prove

satisfactory for use in the selection of materials in that field.

The adequacy of Klautsch's outline for this purpose was then tested by analyzing the subject-matter in four issues each of *Consumers' Guide*, *Hygeia*, *Good House-keeping*, and *Time*. The analysis was made in the following manner:

The entire contents of each of the issues, except advertisements, letters of opinion to the editors, and materials classified in the table of contents as fiction, were carefully read. An attempt was made to identify, with one or more sub-points of Klautsch's outline, every statement which met one or more of its major points. Whenever any portion of the material could not be thus identified, the outline was modified or enlarged sufficiently to enable the identification to be made. The resulting outline, stated in the form of criteria for selecting materials of consumer education, is as follows:

For the purposes of this investigation, an item is considered to be an appropriate part of consumer education if it provides guidance and/or instruction

- A. In making a wise choice of goods and services on the basis of
  - I. Necessity as contrasted with luxury.
  - II. The place of the purchase in the budget.

<sup>1</sup> Adolph A. Klautsch. *The Organization and Administration of Consumer Education*. Unpublished doctor's dissertation, University of Illinois, 1943, pp. 24-34.





- III. Their health values.
- IV. Other standards of value, than health.
- B. In deciding efficiently
  - I. How to buy.
  - II. When to buy.
  - III. Where to buy.
- C. In using goods and services so as to secure
  - I. Efficient operation.
  - II. Maximal "life."

It was obvious that this set of criteria could not be used effectively unless the terms "goods and services" were satisfactorily defined or delimited. A search was therefore made through the literature to determine what goods and services should be included in consumer education.

Thirteen publications from among those already analyzed were found to give designations of "goods and services." A final list was developed by a trial and error process. Minor aspects designated in the sources were combined to make more and more broad and inclusive designations of goods and services. For example, "Home Furnishings," "Home Maintenance," and "Home Heating," which had been listed in three different sources, were considered to be minor aspects of the "Equipment and Maintenance of the Home." Eight designations of areas were thus built up and these included all "goods and services" named in every source.

This list was then tested for adequacy by analyzing with it the same materials by the same technique as had previously been used in testing Klautsch's outline. As this work proceeded, it was found desirable to make minor modifications in the list.

The master list of eight resulting "areas of goods and services" were these:

1. Food.
2. The Equipment and Maintenance of the Home.
3. Clothing, Textiles and Clothing Furnishings.
4. Health and Personal Care.
5. Transportation and Communication.
6. Leisure and Recreational Activity.
7. Education.
8. Savings and Investments.

The next step in this investigation was to determine the reliability and validity of the criteria when they were used for selecting from periodical literature materials dealing

with consumer education. It was decided to use repeated and group judgment in determining respectively the reliability and the validity of the criteria when actually used in selecting such material.

Two issues each of *Consumers' Guide*, *Hygeia*, *Good Housekeeping*, and *Time* were selected at random for the determination of reliability. Every article in each copy of the magazine was first read and evaluated on the basis of the criteria in order to determine whether that article, or any section of it dealt with any phase of consumer education.

The first evaluation was made by the investigator on February 16 and 17, 1947; the second on March 17 and 18, 1947. It was assumed that the lapse of one month between the two analyses would eliminate, to a sufficient extent, whatever practice effect there might be.

When both analysis had been completed, a coefficient of correlation was computed between the results using the tetrachoric diagram method described by Thurstone.<sup>1</sup> The tetrachoric coefficient of correlation between the two analyses was found to be  $.93 \pm .02$ . It seemed reasonable to assume that the criteria for selecting materials of consumer education from periodical literature had a sufficiently high reliability.

The validity of these criteria when used to select materials for consumer education was then determined. Five advanced graduate students in the School of Education at the University of Michigan carefully examined all the articles in the same magazines used by the investigator in his two analyses and indicated their judgments on tabulation sheets provided. The designation given each article by a majority of the judges was considered to be the judges' composite designation of that article. A coefficient of correlation was then computed by the tetrachoric method between the judges' composite designations and

<sup>1</sup> Leone Chesire, Milton Saffir and L. L. Thurstone. *Computing Diagrams for the Tetrachoric Correlation Coefficient*. Chicago: The University of Chicago Bookstore, 1933 (unpagged).



those given by the investigator in his first analysis of the articles.

The tetrachoric coefficient of correlation was found to be  $.82 \pm .05$ . It seemed reasonable, then, to assume that the criteria for selecting materials of consumer education from periodical literature had a sufficiently high validity.

#### THE SELECTION, ORGANIZATION, AND EVALUATION OF MATERIALS OF CONSUMER EDUCATION

The next step was to select and organize materials of consumer education and to evaluate their suitability for integration into seventh, eighth and/or ninth-grade courses of general science.

A study by Gabriel<sup>1</sup> provided specific guidance with respect to the selection of publications to be analyzed in order to obtain items dealing with consumer education. As a part of his survey of methods now employed in the teaching of consumer education in the public high schools of 24 states, Gabriel sent questionnaires to 1,000 teachers of that subject in public high schools. The responses revealed that supplementary materials were considered most effective for consumer education, and that the two kinds of supplementary materials used most frequently and regarded as most highly effective were magazines and government publications; and that of the supplementary sources named and thus evaluated, *Consumers' Guide* led the list.

*Consumers' Guide* was therefore selected as the one government publication to be analyzed.

It was deemed desirable, as a means of obtaining a variety of types of materials, to select for the remaining sources magazines designed for different purposes such as a health magazine, a women's magazine, and a news magazine. Gabriel's findings revealed that of magazines designed for health education, *Hygeia* was rated highest by the respondents; *Good Housekeeping*

was rated highest of the women's magazines; and *Time* was rated highest of the news magazines. It was decided, therefore, to confine the subsequent analysis to the issues of *Consumers' Guide*, *Hygeia*, *Good Housekeeping*, and *Time* published between July 1, 1945, and April 1, 1947.

All the articles, including those under various department headings, in the selected issues were examined with these exceptions:

1. Advertisements
2. Letters of opinion written to the editors
3. Articles and stories which the table of contents classified as fiction

Every article was read for the purpose of finding in it all the "knowledges of consumer education" it contained. A "knowledge of consumer education" was defined as any material that satisfied one or more of the criteria stated. In some articles these knowledges consisted of only a phrase or a sentence or two, and had only minor importance. In many others, however, several knowledges were found in a single article.

Every knowledge was recorded on a tabulation sheet under four headings: Magazine and Date; Page No.; Article Title, and Consumer Knowledges. For example: In *Consumers' Guide* for July, 1945, on page 11, was an article entitled "First Aid for a Sweet Tooth," which contained the knowledge, "Honey and corn sirup may be used in place of cane sugar in cooking and canning."

In the issues of *Consumers' Guide* examined, 267 articles were found to contain 544 knowledges of consumer education; in *Hygeia*, 232 articles were found to contain 582 knowledges of consumer education; in *Good Housekeeping*, 407 articles were found to contain 1,188 knowledges of consumer education; and in *Time*, 1,007 articles were found to contain 1,760 knowledges of consumer education, making a total of 1,913 articles containing 4,074 knowledges of consumer education.

<sup>1</sup> Puzant Gabriel. *Methods of Teaching Consumer Education*. Cincinnati, Ohio: Southwestern Publishing Company, Monograph 54, March, 1946, p. 45.



The 4,074 knowledges of consumer education varied widely in scope. Besides the variations in scope of the articles, there was extensive duplication of knowledges among them. It was, therefore, decided to combine the knowledges into major and mutually exclusive categories.

The following example illustrates how this combining was done. One of the articles, picked at random, which happened to be a question and answer, reads thus:

"Does heat affect canned foods?"

"Canned foods stored in a warm place will not spoil, but there may be some loss in vitamin values. Studies indicate that the vitamin content decreases as storage temperature increases. The loss is not exceptional unless the cans are kept at high temperatures for some time. A cool cellar is best for storage."

The following category was tentatively constructed as an appropriate one under which to record the "consumer knowledge" extracted from the article:

"Storage conditions, with reference to moisture and temperature, for foods, in order to preserve nutritional values."

Subsequent attempts to allocate other knowledges revealed the need for a revision of this category. Such revision was made as often as was necessary as the work proceeded in order that the category would unquestionably include all the knowledges which logically seemed a part of it. The statement which finally resulted from this trial and error process is as follows:

"Optimal conditions of moisture and temperature for storing foods so that the maximal nutritional value may be preserved."

All of the 4,074 knowledges of consumer education were combined in this manner into 281 categories.

It was found that 62 categories were concerned with Food; 45 with The Equipment and Maintenance of the Home; 30 with Clothing Textiles and Clothing Furnishings; 70 with Health and Personal Care; 24 with Transportation and Communication; 21 with Leisure and Recreational Activity; 21 with Education and 8 with Savings and Investments.

A copy of the list of 281 categories was then submitted to three specialists in the teaching of science who, in addition to the investigator, evaluated every category with respect to its suitability for integration into seventh, eighth and/or ninth-grade general science courses.

The scale used was as follows:

- a. Essential for inclusion in the mentioned courses ..... (value + 2)
- b. Some positive value for inclusion (value + 1)
- c. Neither well-suited nor poorly-suited for inclusion ..... (value 0)
- d. Poorly-suited, rather than well-suited for inclusion ..... (value - 1)
- e. Totally unsuited for inclusion... (value - 2)

The algebraic sum of the evaluations of each category was assumed to be the value of that category. On the basis of these results, the 281 categories were arranged in descending order of their values, within the groupings in which they had previously been placed.

Seven of the categories were judged as essential by all four evaluators, and so had a value of plus eight; 105 were judged as totally unsuited and so had a value of minus eight; 74 were given some positive value and 196 were given negative values.

#### THE ASSIGNMENT OF CATEGORIES OF CONSUMER KNOWLEDGES TO PRINCIPLES AND ATTITUDES

The last step was to assign the categories of knowledges of consumer education, judged to be of value for integration into seventh, eighth, and/or ninth-grade courses of general science, to scientific principles to the understanding of which they may be expected to contribute, or to scientific attitudes in the development of which they may be deemed likely to assist.

The principles of science selected for use were the 272 in the "composite list of principles of physical science" assembled by Wise;<sup>1</sup> and the 300 in the "master list of major principles from the biological sci-

<sup>1</sup> Harold E. Wise. *A Determination of the Relative Importance of Principles of Physical Science for General Education*. Unpublished doctor's dissertation, University of Michigan, 1941, pp. 248-91.



ences" assembled by Martin.<sup>2</sup> The scientific attitudes selected for use were the five major ones formulated by Curtis.<sup>3</sup>

Every principle and every attitude was typed on a separate index card and filed. Every category which received a positive value, as described in the preceding step, was typed on a separate slip of paper. The investigator compared every category with every principle and with every attitude in order to determine whether, in his opinion, the material it included could readily be made to contribute to the understanding of that principle or to assist in the development of that attitude. In every case in which such a relationship was discovered, that category was assigned to that respective principle or attitude.

Some of the categories might have been assigned to more than one attitude or principle. It was, however, arbitrarily decided to assign every category to only that principle or attitude with which the relationship was most obvious.

The defensibility of these assignments was checked in two ways:

As a first check, the general science texts written by Caldwell and Curtis, Watkins and Perry, and by Powers, Neuner, Bruner, and Bradley were chosen because they are organized so as to develop understandings of scientific principles and possession of scientific attitudes. The indexes of these books were consulted in order to find the pages on which were presented any of the various topics with which the categories dealt. These pages were then examined in order to determine the principles and/or the attitudes these topics were used to develop.

It was found that the topics were in-

<sup>2</sup> William E. Martin. *A Determination of Principles of Biological Sciences of Importance for General Education*. Unpublished doctor's dissertation, University of Michigan, 1944, pp. 111-57.

<sup>3</sup> Francis D. Curtis. *Some Values Derived from Extensive Reading in General Science*. Teachers College Contributions to Education, No. 163. New York: Teachers College, Columbia University, 1924, pp. 41-9.

cluded under essentially the same principles and/or attitudes by the textbook writers and by the investigator. In no text, however, were any topics discussed from the point of view of consumer education, as here defined.

As a second check, two of the judges who had evaluated the categories examined the principles and attitudes and the various categories which had been assigned to them. Upon completion of the examination both judges expressed the opinion that the assignment of the categories was in every case defensible.

An example of the assignment of knowledges of consumer education to a physical science principle is this:

The particular principle in this case was:

Each combustible substance has a kindling temperature which varies with its condition but may be greater or less than the kindling temperature of some other substance.

The knowledges of consumer education which might be used to develop this principle were:

Devices available for detecting fires in the home.

Comparison of procedures to be used with inflammable and non-inflammable cleaning fluids.

List of causes of fire in home and methods of preventing human injury and reducing property damage.

Meaning of the label of the *Underwriters' Laboratory*, which appears on some household goods.

An example of the assignment of consumer knowledges to a principle of biological science is as follows:

The particular principle is:

Enzymes, vitamins, and hormones are chemical regulators (stimulators and suppressors) of the reactions that occur in living organisms.

The knowledges of consumer education which might be used to develop this principle are:

Comparative vitamin content of food exposed to air or stored for lengthy periods, and fresh foods.

Values of the various vitamins and minerals in the diet.

Comparison of enriched, or fortified, foods with foods which have not been enriched or fortified.

Comparison of commercial vitamin and mineral products with natural food as sources of food nutrients.

## SCIENCE EDUCATION

An example of assignment of knowledges of consumer education to a scientific attitude is as follows:

The particular attitude is:  
Habit of weighing evidence.

The assigned knowledges of consumer education are:

Methods of examining, and factors to be considered in reading labels accompanying food products.

Simple tests for detecting adulterants in foods.

Comparison of fresh, canned, and frozen food products with respect to cost, nutritional values, and methods of preparing and of cooking.

Comparison of quantities of food in various sizes of cans, glass jars and bottles, baskets and hampers.

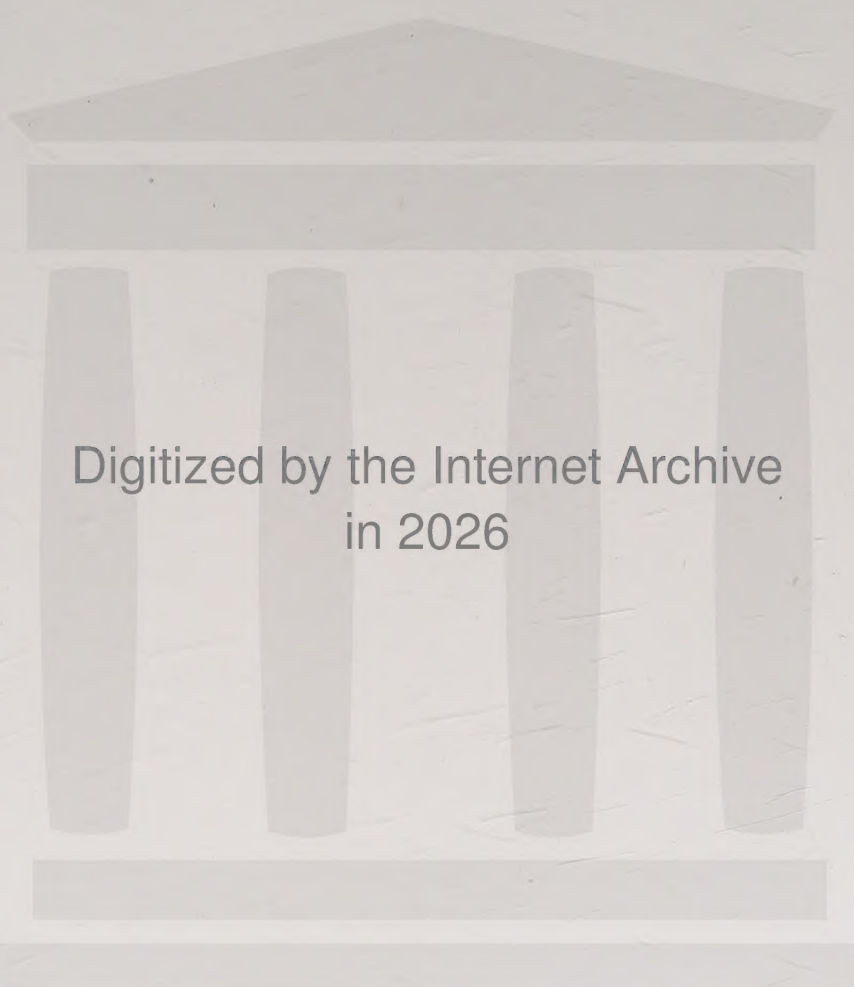
Methods of checking for accurate weight and number when purchasing food products.

1. Seventy-three of the seventy-four categories which had received a positive value as explained in the preceding step were assigned to principles and/or attitudes.

2. Thirteen were assigned to 10 principles of physical science to the understanding of which they were judged to contribute; 45 were similarly assigned to 18 principles of biological science; and 15 to 3 scientific attitudes.

It seems reasonable therefore to assume that the knowledges of consumer education refined in this study may be used to contribute to the understanding of principles of science and to the development of scientific attitudes.





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